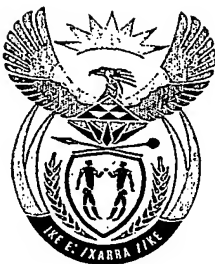


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provisional specification and drawings of South African Patent Application
No. 2003/0371 filed on 14 January 2003 in the name of BOGDAN
BOGDANOVIC and subsequently substituted to ROLLERBRAKE (PTY) LTD
on 27 January 2004 for an invention entitled "Braking Mechanism for a
Conveyor Idler".

Geteken te

PRETORIA

in die Republiek van Suid-Afrika, hierdie

Signed at

in the Republic of South Africa, this

23th

dag van

March 2004

day of

Registrar of Patents

Best Available Copy

OFFICIAL APPLICATION		LODGING DATE: PROVISIONAL		ACCEPTANCE DATE	
21	2003/0371	22	14 JAN 2003	47	
INTERNATIONAL CLASSIFICATION		LODGING DATE: COMPLETE		GRANTED DATE	
51		23			
FULL NAME(S) OF APPLICANT(S)/PATENTEE(S)					
71	BOGDANOVIC, BOGDAN AANSOEKERS VERVANG APPLICANTS SUBSTITUTED				
APPLICANTS SUBSTITUTED:				DATE REGISTERED	
71	ROLLER BRAKE (PROPRIETARY) LTD				27. 07. 2004
ASSIGNEE(S)					
71					DATE REGISTERED
FULL NAME(S) OF INVENTOR(S)					
72	BOGDANOVIC, BOGDAN				
PRIORITY CLAIMED		COUNTRY		NUMBER	
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54	BRAKING MECHANISM FOR A CONVEYOR IDLER				
ADDRESS OF APPLICANT(S)/PATENTEE(S)					
Broeders Home & Garden Centre Craigh van Houster 19 NIGHTINGALE CRESCENT, RANDBURG, KRUGERSDORP, SOUTH AFRICA 186 Floor 4b, Randburg, 2194 Gauteng S.A.					
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74	SPOOR & FISHER, SANDTON				S & F REF
PATENT OF ADDITION NO.				PA134570/P	
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FRESH APPLICATION BASED ON				DATE OF ANY CHANGE	

SPOOR & FISHER

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

REPUBLIC OF SOUTH AFRICA
REVENUE

APPLICATION FOR A PATENT
AND ACKNOWLEDGEMENT OF RECEIPT
(Section 30 (1) - Regulation 22)

R 0060,00

The granting of a patent is hereby requested by the undermentioned applicant on the basis of the present application filed in duplicate

OFFICIAL APPLICATION NO.

21 01 **2003/0371**

HASR 711

REPUBLIC OF SOUTH AFRICA
S & F REFERENCE

PA134570/P

71 **BOGDANOVIC, BOGDAN** FULL NAME(S) OF APPLICANT(S) **AANSOEKERS VERVANG**

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54 **BRAKING MECHANISM FOR A CONVEYOR IDLER**

THE APPLICANT CLAIMS PRIORITY AS SET OUT ON THE ACCOMPANYING FORM P.2. THE EARLIEST PRIORITY CLAIM IS:

COUNTRY: NIL

NUMBER: NIL

DATE: NIL

THIS APPLICATION IS FOR A PATENT OF ADDITION TO PATENT APPLICATION NO.

21 01

THIS APPLICATION IS A FRESH APPLICATION IN TERMS OF SECTION 37 AND IS BASED ON APPLICATION NO.

21 01

THIS APPLICATION IS ACCOMPANIED BY:

- ☒ 1. A single copy of a provisional specification of 9 pages.
- ☒ 2. Drawings of 2 sheets.
- ☐ 3. ~~Particulars~~ particulars and abstract (Form P.8 in duplicate).
- ☐ 4. A copy of Figure of the drawings (if any) for the abstract.
- ☐ 5. Assignment of invention.
- ☐ 6. Certified priority document.
- ☐ 7. Translation of the priority document.
- ☐ 8. Assignment of priority rights.
- ☐ 9. A copy of the Form P.2 and the specification of S.A. Patent Application No.
- ☐ 10. Declaration and power of attorney on Form P.3.
- ☐ 11. Request for ante-dating on Form P.4.
- ☐ 12. Request for classification on Form P.9.
- ☒ 13. Form P.2 in duplicate.
- ☐ 14. Other.

4 ADDRESS FOR SERVICE: SPOOR & FISHER, SANDTON

Dated: 14 January 2003

SPOOR & FISHER
PATENT ATTORNEYS FOR THE APPLICANT(S)

RECEIVED

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TRADE MARKS AND COPYRIGHT

2003-01-14

REGISTRAR OF PATENTS

REGISTRAR VAN PATENTE, MODELLE,
HANDELSMERKE EN OORDEURSREG

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

PROVISIONAL SPECIFICATION

(Section 30(1) - Regulation 27)

OFFICIAL APPLICATION NO.

21	01	2003/0371
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LODGING DATE

22	14 JANUARY 2003
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FULL NAMES OF APPLICANTS

71	BOGDANOVIC, BOGDAN	Rollerbrake (Proprietary) JSD
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AANSOEKERS VERVANG
APPLICANTS SUBSTITUTED

FULL NAMES OF INVENTORS

72	BOGDANOVIC, BOGDAN
----	--------------------

TITLE OF INVENTION

54	BRAKING MECHANISM FOR A CONVEYOR IDLER
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REGISTRAR OF PATENTS DESIGNS,
TRADE MARKS AND COPYRIGHT

2003-01-14

REGISTRATEUR VAN PATENTE, MODELLE,
HANDELSMERKE EN OUTEURSREG

BACKGROUND OF THE INVENTION

THIS invention relates to conveyor idlers, and more specifically to a braking mechanism for a conveyor idler.

Conveyor belts generally are driven by one or more motors and are arranged to run over idlers or idler rollers which are supported on a conveyor frame. The idlers often are free to run in both the forward and reverse directions which is undesirable on inclined conveyor belts because the snapping of the belt or the tripping of the conveyor motor can cause the conveyor belt to move in the reverse direction under the load of the conveyor. Apart from being a safety hazard, this can result in damage to the conveyor structure and extended downtime.

Braking mechanisms for conveyor belts are known. Generally, these mechanisms are arranged to act directly on the conveyor belt and usually are exposed. Accordingly, these braking mechanisms tend to be damaged relatively easily, and frequently require maintenance.

South African patent 2001/8853 discloses a brake mechanism which is located inside the conveyor idler. This mechanism includes a guide fixed to the idler shaft and a plurality of ball bearings which are engageable with the guide and with the inner surface of the idler drum. The ball bearings allow the conveyor idler to rotate in a forward direction but prevent rotation of the idler in a reverse direction by jamming between the guide and the inner surface of

the idler drum. Although the brake mechanism is concealed and therefore less prone to damage, it has to extend between the idler shaft and the idler drum, and hence is relatively bulky. Furthermore, the mechanism contacts the idler drum even when the idler rotates in the forward direction, resulting in relatively high wear and the need for lubrication and maintenance.

It is an object of the present invention to provide a braking mechanism for a conveyor idler which is located within the idler, which does not contact the idler shaft when the idler rotates in the forward direction, and which requires no lubrication or maintenance.

SUMMARY OF THE INVENTION

According to a first aspect of the invention there is provided a braking mechanism for a conveyor idler rotatable about an idler shaft, the braking mechanism including:

- a housing which is connected or connectable to the conveyor idler so as to be rotatable about the idler shaft;

- a plurality of rollers; and

- a resilient holder for holding the rollers adjacent an inner surface of the housing, the holder being rotatable with the housing about the idler shaft and being moveable, automatically, upon sudden deceleration of the conveyor idler, between an inoperative condition in which the rollers are held away from the idler shaft so as to allow rotation of the conveyor idler in a forward direction, and an operative condition in which the rollers engage the inner surface of the housing and the idler shaft so as to prevent rotation of the conveyor idler in a reverse direction.

Preferably, the inner surface of the housing defines recessed portions, each of which includes a wedging surface for wedging one of the rollers between the housing and the idler shaft in the operative condition of the resilient holder. In this embodiment, the wedging surfaces slope inwardly towards the outer surface of the idler shaft from first ends of these surfaces adjacent the rollers in the inoperative condition of the resilient holder to second ends thereof adjacent the rollers in the operative condition of the resilient holder.

In a particularly preferred embodiment, the wedging surfaces are arranged to deform the resilient holder as the holder moves into the operative condition, thereby to force the rollers inwardly into contact with the conveyor idler shaft.

In one form of the invention, the braking mechanism is located within an idler bearing housing.

The resilient holder may comprise a pair of rings spaced from one another by a plurality of webs which hold the rollers between the inner surface of the housing and the idler shaft.

Typically, the resilient holder is formed from a plastics material, and is arranged to hold four rollers within the braking mechanism housing.

According to a second aspect of the invention there is provided a conveyor idler which is rotatable about an idler shaft in a forward direction, and which includes at least one braking mechanism as described above located within the conveyor idler for preventing rotation of the conveyor idler about the idler shaft in a reverse direction.

Preferably, the idler drum or shell is formed from a metal or a metal alloy.

Typically, conveyor idler bearings and the at least one braking mechanism are fixed to bearing housings defined by end caps for the conveyor idler.

In one arrangement, the end caps are formed from a metal or a metal alloy and are welded to the idler drum.

Alternatively, the end caps may be formed from a plastics material and may be arranged to form a friction fit with the idler drum.

The idler may include seals for preventing the ingress of dirt or other undesirable substances into the bearing housings.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings in which:

Figure 1 shows a cross-sectional view of one end of a conveyor idler according to the present invention;

Figure 2 shows a cross-sectional view, along the line 2-2 in Figure 1, of a braking mechanism for the conveyor idler in an inoperative condition;

Figure 3 shows a cross-sectional view of the braking mechanism of Figure 2 in an operative condition; and

Figure 4 shows a cross-sectional view of one end of a conveyor idler

according to another embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 of the drawings illustrates a portion of a conveyor idler according to the present invention. The idler is designated generally with the reference numeral 10 and includes a cylindrical conveyor drum 12 and a pair of end caps 14 (only one of which is shown) connected to the drum with welds 16. In this embodiment of the invention, the drum 12 and the end caps 14 are formed from a metal or a metal alloy.

The conveyor drum defines an outer surface 18 which is designed to engage a conveyor belt (not illustrated), and each end cap 14 defines a bearing housing 20 for a ball bearing 22. The bearings 22 are fixed to the end caps 14 and connect the idler 10 to a conveyor idler shaft 24, as shown. The ball bearings 22 are conventional in nature and therefore will not be described in any further detail. As can be seen, the bearings 22 are protected by labyrinth seals 26 which prevent the ingress of dirt or other undesirable substances into the bearing housing 20 at each end of the conveyor idler. Adjacent each bearing 22, a braking mechanism 30 allows the idler 10 to rotate in a forward direction about the idler shaft 24, but prevents the conveyor idler from rotating about the idler shaft in a reverse direction, as described in more detail below.

With reference also to Figures 2 and 3 of the accompanying drawings, the braking mechanism 30 includes a housing 32 which defines four recessed portions 34. Each recessed portion 34 defines a wedging surface 36 which slopes inwardly towards the idler shaft 24 from a first end 38 of the recessed

portion to a second end 40 thereof. The mechanism 30 also includes a resilient holder 42 which in this embodiment is formed from a plastics material. The holder 42 comprises a pair of rings 44 (only one of which is shown in Figures 2 and 3) spaced from one another by a plurality of webs 46. The webs are designed to hold rollers 48 between the inner surface of the housing 32 and the outer surface of the idler shaft 24.

Referring back to Figure 1, the outer surface of the braking mechanism 30 is fixed to one of the end caps 14 so that the housing 32 is fixed relative to the conveyor drum 12. In this way, as the conveyor belt passes over the conveyor drum, in use, and the conveyor drum rotates on the bearings 22, the braking mechanism housing 32 rotates about the idler shaft 24.

In Figure 2, the braking mechanism 30 is shown in an inoperative condition in which the conveyor idler 10 rotates in a forward direction, as indicated by the arrow F. In this condition, the rollers 48 are held by the holder 42 within the recessed portions 34 so as not to engage the wedging surfaces 36 of the housing 32 or the outer surface of the idler shaft 24. Accordingly, the conveyor drum 12 is allowed to rotate about the idler shaft free from any interference from the rollers 48. It will be appreciated that without contact between the idler shaft 24 and the components of the braking mechanism 30, there is no wear on the braking mechanism components during forward rotation of the conveyor idler. As a result, the mechanism 30 does not require lubrication or maintenance.

Upon sudden deceleration of the conveyor idler about the idler shaft 24, for example if a loaded conveyor belt snaps on an incline, the housing 32 decelerates at the same rate as the conveyor drum 12, faster than the holder 42 which is free to move within the housing 32 from the inoperative condition

illustrated in Figure 2 to an operative condition, as illustrated in Figure 3. As the rollers 48 move into the operative condition, the wedging surfaces 36 drive the rollers slightly inwardly into contact with the outer surface of the idler shaft 24. Any subsequent rotation of the housing 32 in the reverse direction, as illustrated by the arrow R in Figure 3, causes the rollers 48 to jam between the wedging surfaces 36 and the shaft 24, thereby preventing rotation of the idler 10 in the reverse direction.

It will be appreciated that the resilient nature of the holder 42 allows the rollers 48 to be held away from the idler shaft 24 in the inoperative condition, and to engage the idler shaft as the holder deforms in the operative condition.

Figure 4 illustrates a conveyor idler 110 according to another embodiment of the invention which is suitable for lighter-weight applications. The idler 110 is similar in many respects to the idler 10 and also includes a drum 112 which is rotatable on bearings 122 about a shaft 124. However, in this embodiment, the shaft 124 is held in end sockets 125 which are mountable to a conveyor frame (not illustrated). A braking mechanism 130 similar to the braking mechanism 30 illustrated in Figures 1 to 3 of the drawings is fixed to end caps 114 (only one of which is shown). In this embodiment, the end caps are formed from a plastics material and are sized to form a friction fit with the conveyor drum 112. Seals 126 prevent the ingress of dirt and other undesirable substances into the bearing housings containing the bearings 122.

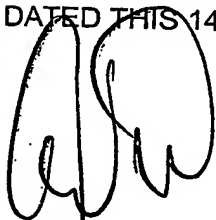
The braking mechanism 130 is designed to operate in the same manner as that described above with reference to the first embodiment of the invention so as to allow the conveyor idler 110 to rotate in a forward direction and to

- 8 -

prevent rotation of the idler in a reverse direction.

One advantage of the braking mechanism according to the present invention is that it is protected within the conveyor idler. Furthermore, it will be appreciated that by avoiding contact between the braking mechanism and the conveyor idler shaft during forward rotation of the idler, there is no wear, and no need for lubrication or maintenance. Yet a further advantage of the braking mechanism according to the present invention is that it does not extend between the conveyor drum and the idler shaft. Accordingly, the braking mechanism may be formed as a relatively small unit at a comparatively low cost, and may be formed as an integral part of the bearings for the conveyor idler.

DATED THIS 14TH DAY OF JANUARY 2003



SFOOR & FISHER

APPLICANT'S PATENT ATTORNEYS

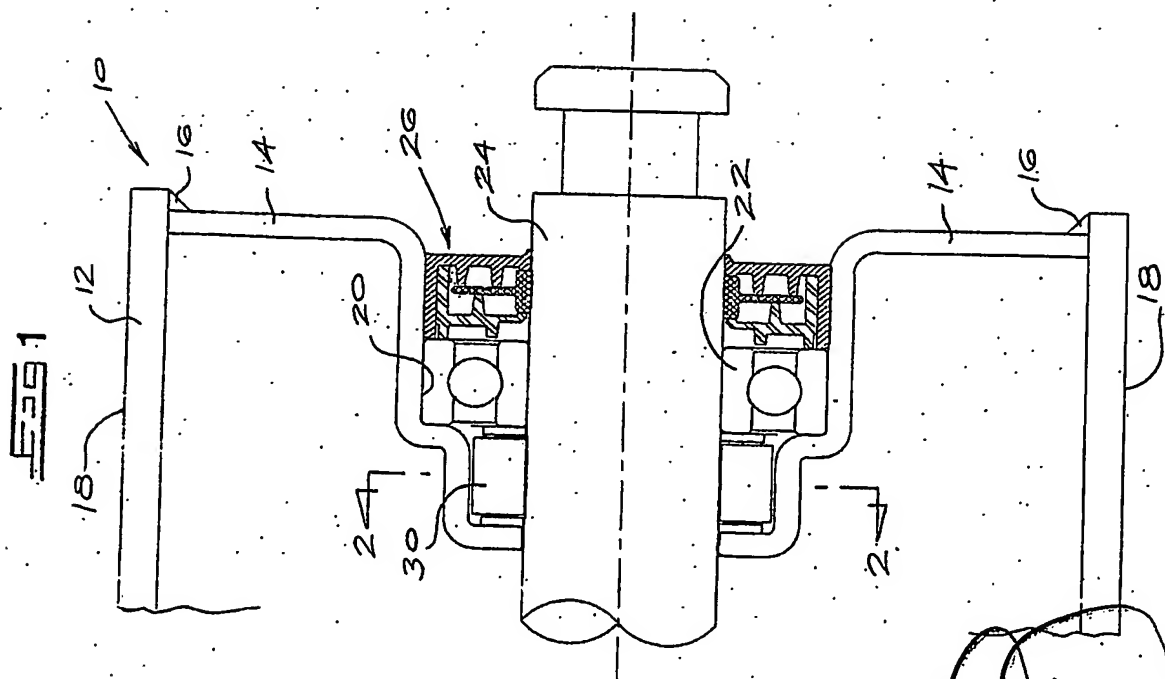
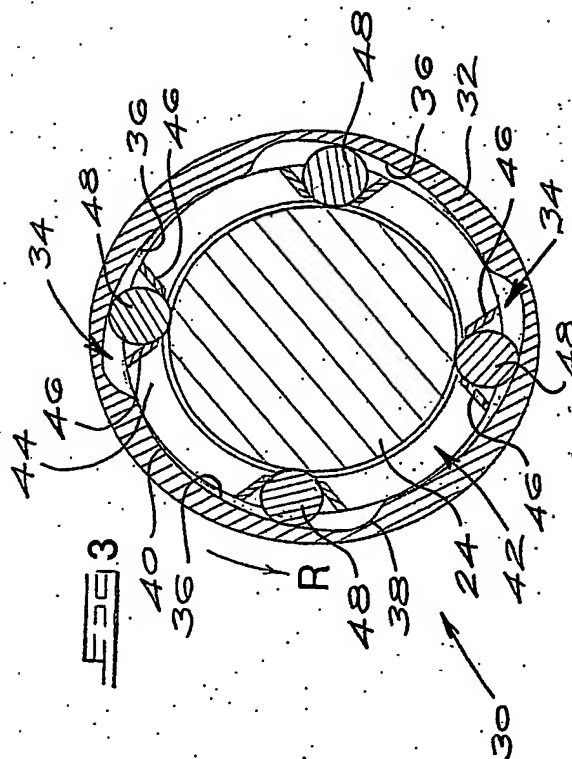
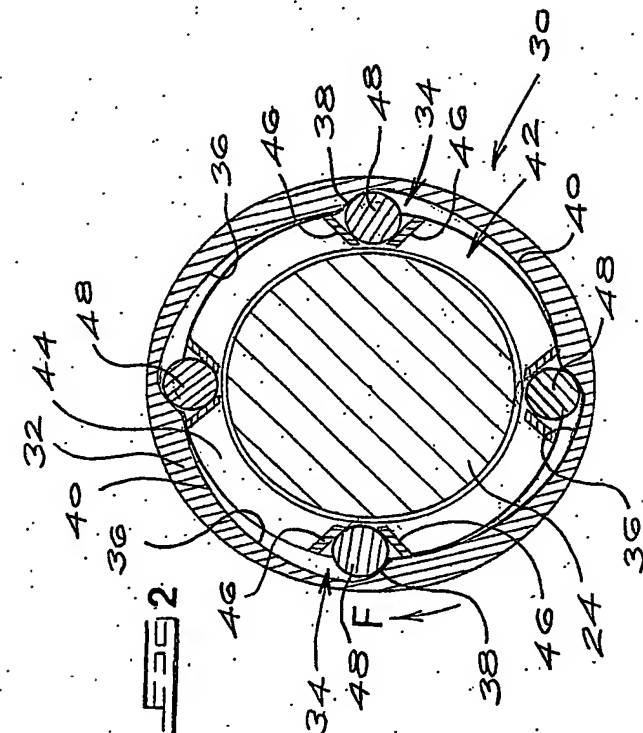
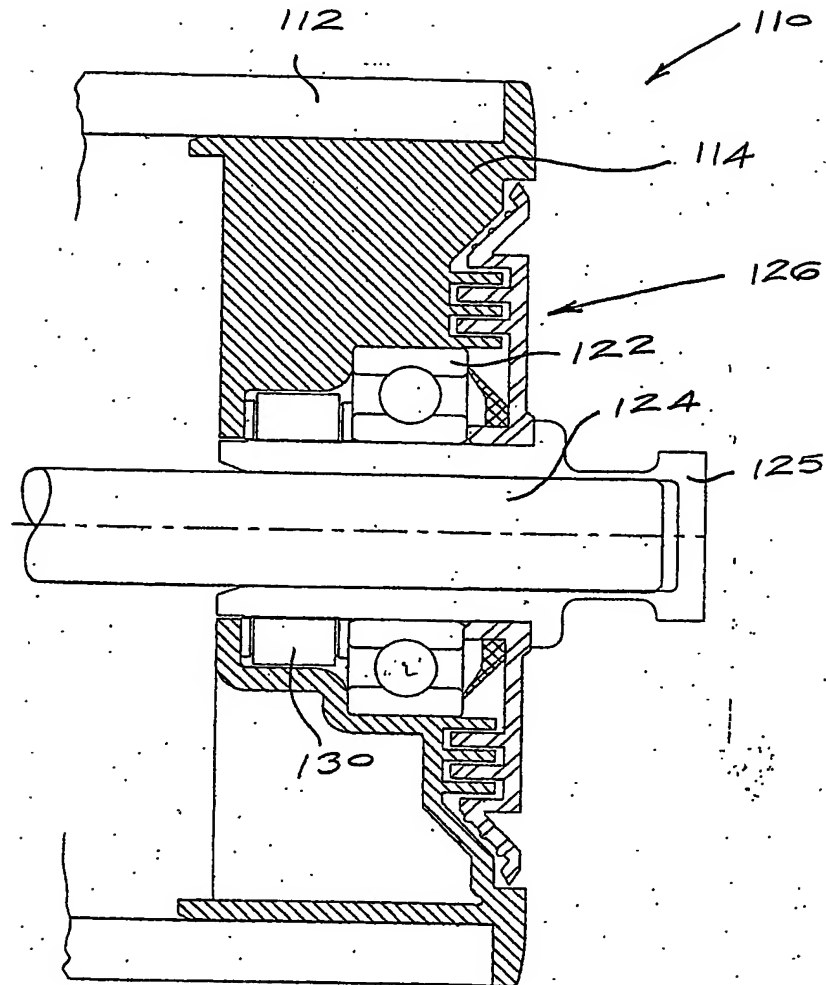
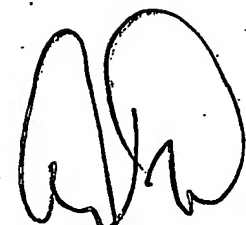


FIG 4




CROOKED EIGHT

The documents attached hereto are true copies of the P2, P1, P6, provisional specification and drawings of Patent

- Application No - 2003/0871
on 14 January 2003
filed in the name of
BOGDAN BOGDANOVICH and
subsequently assigned to
Rollerbruce (Pty) Ltd. for
an invention entitled "Braking
Mechanism for a conveyor idler."

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